1.2 IN THE SPECIFICATION:

Please amend the Specification as follows:

[0003] In U.S. Pat. No. 5,608,105 for example, a process is described wherein levulinic acid is produced from cellulose or ligno-cellulose material by ~~hydrolysing~~hydrolyzing the material at a temperature between 210 and 230°C in the presence of 1-5% weight of mineral acid in a first reactor to obtain a hydroxymethylfurfural-containing intermediate product and further ~~hydrolysing~~hydrolyzing the intermediate product at a temperature between 195 and 215°C in the presence of 3-7.5% weight of mineral acid in a second reactor. The temperature in the first and the second reaction vessel is controlled by injection of high pressure steam. The process pressure is above 200 psig (14 bar g) in the second vessel and much higher in the first vessel.

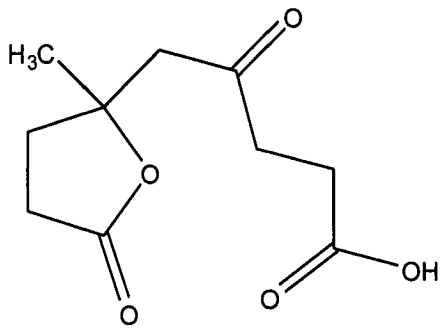
[0004] In U.S. Pat. No. 6,054,611, a process is described wherein biomass containing cellulose and hemicellulose is mixed with ~~sulphuric~~sulfuric acid to form an aqueous reaction solution having about 20-40% by weight of biomass and 10-30% by weight of acid. The reaction solution is first maintained below 60°C to ~~decrystallise~~de-crystallize the biomass and then heated to 80-200°C to ~~hydrolyse~~hydrolyze the biomass to form sugars, which then react to form levulinic acid.

[0013] Accordingly, the present invention relates ~~to~~ato a process for the liquefaction of lignocellulosic or cellulosic material, wherein solid lignocellulosic or cellulosic material is heated at a temperature in the range of from 100 to 300°C in the presence of an acid catalyst and a solvent, wherein the solvent-to-solid material weight ratio is at most 50, the acid catalyst is present in a

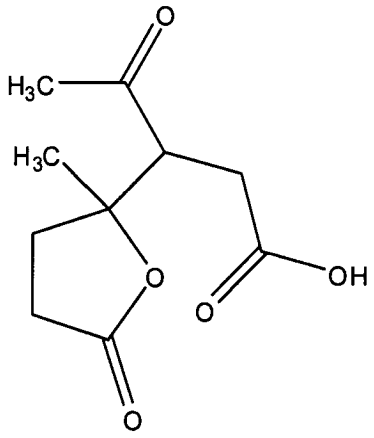
concentration of at most 50% by weight of acid based on the weight of solvent and acid, and the solvent comprises a compound having a gamma lactone group of the general molecular formula wherein $\mathbf{R_1}$ to $\mathbf{R_6}$ each represent, independently, a hydrogen atom or an organic group connected with a carbon atom to the lactone group.

[0014] The invention further relates to the herein-above defined process for the liquefaction of lignocellulosic or cellulosic material, wherein the solvent comprises furfural, levulinic acid or a compound obtainable from furfural or levulinic acid by hydrogenation, dehydration, aldolcondensation, ~~dimerisation~~dimerization or ~~oligomerisation~~oligomerization, esterification with an alcohol, or a combination of two or more of these reactions.

[0018] Preferably, each of $\mathbf{R_1}$ to $\mathbf{R_4}$ is a [[H]]hydrogen (H) atom. More preferably, each of $\mathbf{R_1}$ to $\mathbf{R_4}$ is a H atom and $\mathbf{R_5}$ is a methyl group. Particularly preferred examples of such compounds are gamma valerolactone ($\mathbf{R_6}$ is a H atom), also known as 5-methyldihydrofuran-2(3H)-one, 2-methyl-5-oxotetrahydrofuran-2-carboxylic acid ($\mathbf{R_6}$ is a carboxyl group), a compound with a molecular structure according to any one of molecular formulas (2) to (5)~~, or an ester of a compound according to formula (2) or (3)~~:



(2)



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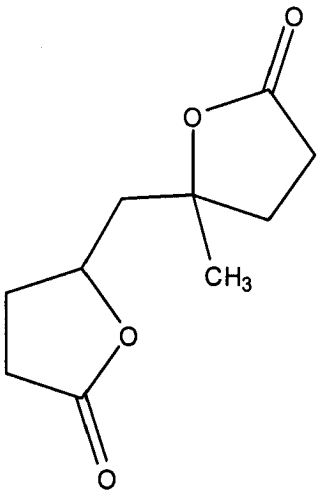

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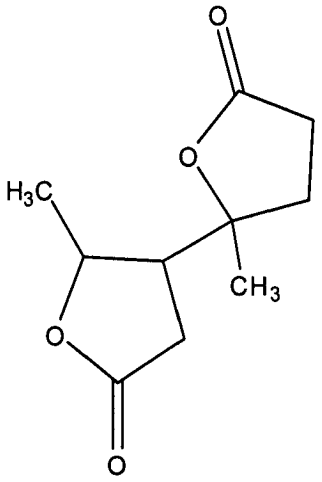
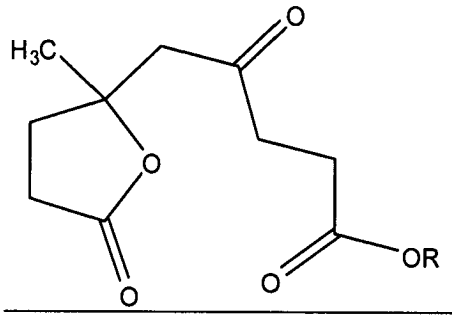
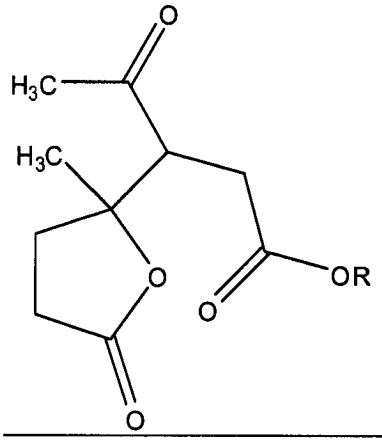


(5),

or an ester compound according to molecular formula (2a) or (3a):



(2a)

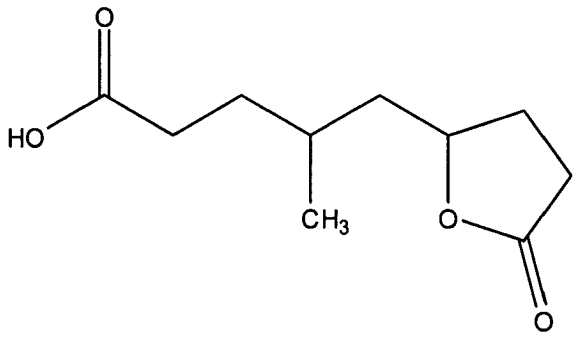


(3a),

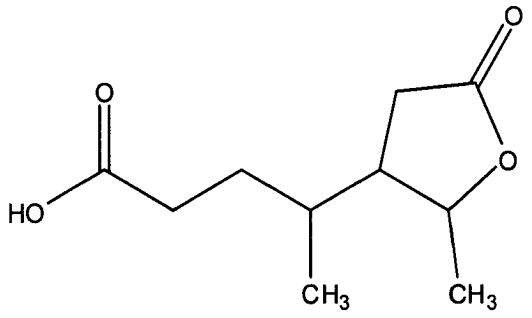
wherein **R** is C_{1-10} alkyl.

Gamma valerolactone can be obtained from levulinic acid by hydrogenation followed by dehydration (internal ester formation). The compounds according to formulas (2) to (5) are levulinic acid dimers that may be obtained by contacting levulinic acid in the presence of hydrogen with a strongly acidic catalyst having a hydrogenating function, *e.g.*, Pd/cation-exchange resin, at elevated temperature and preferably at elevated pressure. Typical process temperatures and pressures are in the range of from 60 to 170°C and of from 1 to 200 bar (absolute), respectively. Such process for levulinic acid ~~dimerisation~~dimerization is described in detail in co-pending patent application EP 04106107.8. The catalyst and process conditions of this process are similar to those applied in the known single-step process for the production of methyl isobutyl ketone from acetone.

[0020] Other compounds with a gamma lactone (γ-lactone) group suitable to be used as solvent in the liquefaction process according to the invention, which are obtainable by the above-mentioned levulinic acid ~~dimerisation~~dimerization process, are the compounds with a molecular structure according to formula (6) or (7) ~~or theirs esters~~:

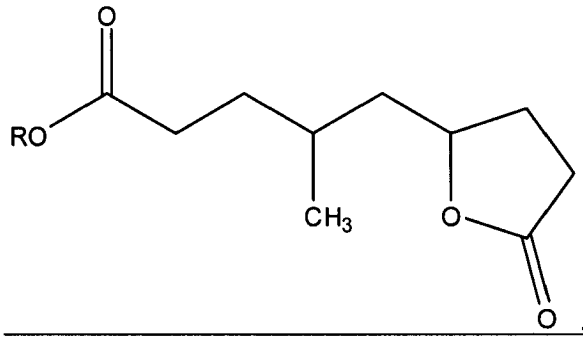


(6)

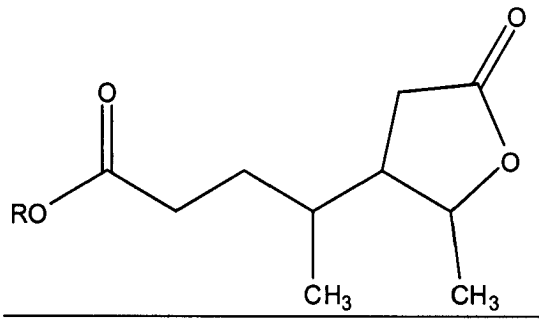


(7),

or their esters, (6a) and (7a):



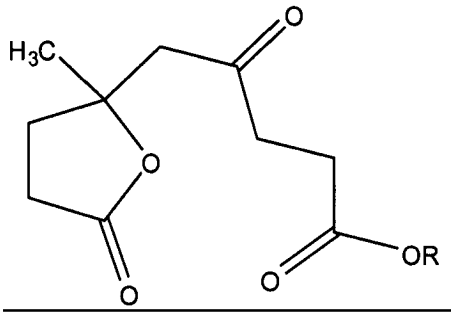
, (6a)



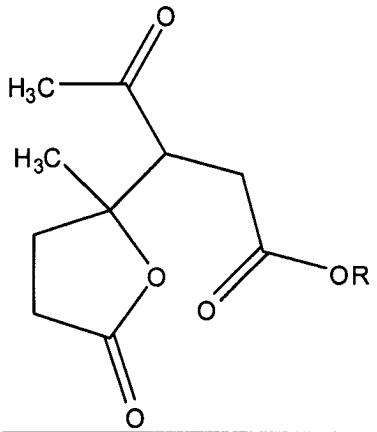
(7a),

wherein **R** is C_{1-10} alkyl.

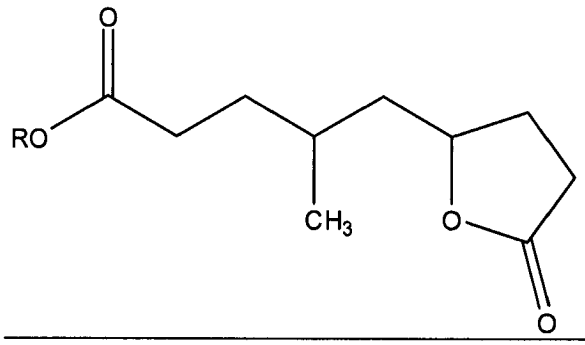
[0021] If the compound with a gamma lactone group is an ester of an acid according to molecular formula (2), (3), (6) or (7), then the ester preferably is an alkyl ester with an alcohol fragment with at most 10 carbon atoms, more preferably a linear alkyl ester with an alcohol fragment with at most 5 carbon atoms, even more preferably a methyl or an ethyl ester (*i.e.*, **R** = C_{1-10} alkyl) as shown in molecular formulas (2a), (3a), (6a) and (7a):



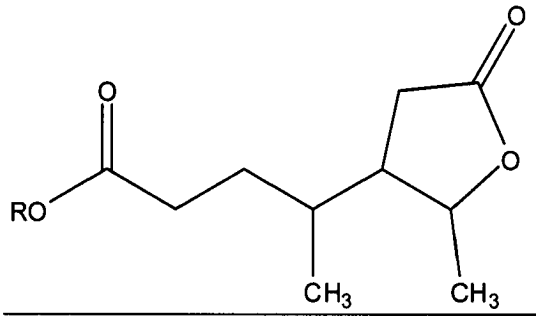
(2a),



(3a),



(6a), or



(7a),

wherein **R** is C_{1-10} alkyl.

[0022] Compounds with a gamma lactone group suitable to be used as solvent in the liquefaction process according to the invention may also be formed by ~~dimerisation~~dimerization or ~~oligomerisation~~oligomerization of ~~Alpha-Angelica lactone~~α-Angelica lactone may be obtained from levulinic acid by internal ester formation (dehydration) of the enol form of the carbonyl group in levulinic acid.

[0023] The compounds with a gamma lactone group are preferably obtainable from levulinic acid by hydrogenation, dehydration, aldolcondensation, ~~dimerisation~~dimerization or ~~oligomerisation~~oligomerization, esterification with an alcohol, or a combination of two or more thereof. Examples of such compounds have been mentioned hereinabove.

[0026] Examples of suitable compounds without a gamma lactone group obtainable from levulinic acid are C_5 compounds that can be obtained from levulinic acid by dehydration or dehydration in combination with hydrogenation, such as ~~Alpha Angelica lactone~~α-Angelica lactone, 1,4-pentanediol, 1-pentanol, 2-pentanol, or methyl tetrahydrofuran. The conversion of levulinic acid in these compounds is described in more detail in U.S. Pat. No. 5,883,266.

[0027] Another example of a suitable compound obtainable from levulinic acid is 4-methyl-6-oxononanedioic acid or a mono- or di-ester thereof. Such mono- or di-ester preferably has an alcohol fragment with at most 10 carbon atoms, more preferably a linear alcohol fragment with at most 5 carbon atoms, even more preferably is the di-methyl or the di-ethyl ester. 4-methyl-6-oxononanedioic acid is the main dimer that is obtained in the above-described levulinic acid ~~dimerisation~~dimerization process in the presence of hydrogen and a strongly acidic hydrogenation catalyst.

[0032] Examples of suitable strong mineral acids are ~~sulphuric~~sulfuric acid, para toluene ~~sulphonic~~sulfonic acid, phenol ~~sulphonic~~sulfonic acid, phosphoric acid, or hydrochloric acid. Preferred mineral acids are ~~sulphuric~~sulfuric acid or phosphoric acid, since they have a relatively high boiling point and thus remain liquid and stable at the process temperature at ambient pressure. Particularly preferred is phosphoric acid. Compared to ~~sulphur~~sulfur-containing acids, phosphoric acid has the advantage that recovered phosphoric acid can be converted into valuable products such as fertilizers and that it is less prone to coking.